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FISHERIES

ANNUAL FISH POPULATION
AND
ANGLER USE AND SPORT FISH HARVEST SURVEYS
ON
LAKE FRANCIS CASE, SOUTH DAKOTA, 2002

South Dakota
Department of
Game, Fish and Parks
Wildlife Division
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LAKE FRANCIS CASE, SOUTH DAKOTA, 2002

by

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PREFACE

Information collected during 2002 is summarized in this report. Copies of this report and references to the data can be made with permission from the authors or Director of the Division of Wildlife, South Dakota Department of Game, Fish and Parks, 523 E. Capitol, Pierre, South Dakota 57501-3182.

The authors would like to acknowledge the following individuals from the South Dakota Department of Game, Fish and Parks who helped with administrating, data collection, editing, or manuscript preparation: Gerald Wickstrom, James Riis, Dennis Unkenholz, John Lott, Wayne Nelson-Stastny, Robert Hanten, Sandi Knippling, Darla Kusser, Tim Anderson, Michael Bertrand, Richard Crandell III, Chris Mangus, and Cade Steffenson.

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EXECUTIVE SUMMARY

This report includes annual fish population and angler use and harvest data, from 1998 through 2002, for Lake Francis Case (LFC), South Dakota. These surveys, their results and interpretation, are major strategy and evaluation tools for planning efforts outlined in the Missouri River Fisheries Program Strategic Plan. Results and discussion presented pertain to changes in fish community and population characteristics, sport fishing use and harvest, and evaluation of management activities and regulations.

Walleye catch per unit of effort (CPUE; No./min.), during 2002 spring-spawning-run electrofishing, near Chamberlain, increased from the 2001 value and remained well within the five-year range. Walleye electrofishing CPUE from the face of Ft. Randall Dam declined from 2001, but remains near the high end of the five-year period.

Fall gill netting collected 16 fish species. Walleye CPUE (No./net night), in 2002, increased over that observed in 2001, primarily due to the catch of age-0 walleye. Sauger and channel catfish CPUE's increased in 2002 and both were the highest of the five-year period. Mean white bass CPUE declined from the previous year, but remained within the five-year range. Smallmouth bass and yellow perch mean CPUEs increased over the 2001 values and remained within their respective five-year ranges.

Sixteen species of age-0 fishes or small littoral prey species were collected by seining in 2002. Age-0 gizzard shad dominated 2002 seine catches, accounting for 97% of the total catch. White bass, emerald shiners, yellow perch, walleye, and spottail shiners were also common in the seine catches

Walleye population parameter values were generally similar to those documented a year ago. Walleye abundance, mean age, growth, Wr and PSD were all similar to previous year's values, while survival decreased. Sauger population parameter values were all generally within their five-year ranges. The number of smallmouth bass collected in fall netting surveys was inadequate to make meaningful population parameter comparisons.

Anglers fishing LFC in 2002, during the April through September daylight period, exerted an estimated 714,500 hours of angling pressure, down from the 780,000 hours estimated in 2001 and down over 200,000 hours from the high estimated in 1999. Total fish harvest in 2002, was estimated at about 215,275 fish. Walleye dominated the harvest, with an estimated harvest of 178,666 fish, down from the 2001 estimate. Estimated mean length of harvested walleye was 40.5 cm (15.9 in). Channel catfish, white bass, sauger, and smallmouth bass were also common in the harvest. An excellent overall catch rate (harvest and release rates combined) of near 1.1 fish/angler-h was estimated for the April-September daylight period. Total catch, release and harvest rates for walleye were 0.88 walleye/angler-h, 0.62 walleye/angler-h, and 0.25 walleye/angler-h, respectively. Approximately 82 percent of LFC anglers expressed some degree of satisfaction with their angling trip. Anglers from South Dakota and 18 other states, fishing LFC, generated a local economic impact estimated at approximately 11.2 million dollars, in 2002. Results from several questions regarding LFC angler attitudes and preferences are reported.

TABLE OF CONTENTS

LIST OF TABLES

List of tables continued...

List of tables continued...

List of tables continued...

LIST OF FIGURES

LIST OF APPENDICES

ANNUAL FISH POPULATION
AND
ANGLER USE AND SPORT FISH HARVEST SURVEYS
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LAKE FRANCIS CASE, SOUTH DAKOTA, 2002

INTRODUCTION

Lake Francis Case (LFC), a 32,000 ha Missouri River mainstem reservoir, provides a significant portion (Table 1) of the more than 500,000 angler days of recreation that occur annually (SDGFP 1994) on this large river/reservoir system. Overall, the river segments and reservoirs comprising the Missouri River system, in South Dakota, provide a large and diverse portion of the state's available fishing opportunity. The importance of this system to South Dakota anglers was documented in a 1992 Angler Use and Preference Survey (Mendelsohn 1994, Stone 1996a), in which 50 percent of the respondents listed the "Missouri River and its reservoirs" as their preferred fishing area. Recognizing the importance of the Missouri River, strategic planning efforts (SDGFP 1994) by the South Dakota Department of Game, Fish and Parks (SDGFP) have designated the Missouri River as a specific planning program within this overall planning effort.

In recent years LFC has supported over 200,000 angler trips annually (Stone and Sorensen 1999, 2000). Walleye/sauger, and to a lesser extent smallmouth bass, white bass and channel catfish, provide the majority of sport fishing opportunity available in this reservoir. Over the past 23 years, management of the walleye sport fishery has undergone several significant changes in response to changes in walleye population structure and angler use and harvest (Stone 1990; Stone et al. 1994; Stone and Sorensen 1999, 2001). For 2003, the only regulation modification for LFC is a one-month (April) extension to a fishing closure in a small area located in the upper portion of the reservoir commonly referred to as the "dredge hole". Current sport fish management regulations for walleye/sauger and their hybrids for LFC include:

- daily and possession limits of 4 and 8 per angler, respectively.
- a minimum length limit of 381 mm (15 in.) for all months of the year except July and August.
- anglers are allowed only one walleye/sauger or hybrid per day longer than 457 mm (18 in.), year-round.
- anglers are not allowed to "cull" walleye/sauger or hybrids.
- anglers fishing through the ice in the lower half of the reservoir are required to keep the first four walleye/sauger or hybrids they catch, size restrictions do not apply.
- closed area: the area in the upper portion of the reservoir, between 1-90 and the railroad bridge, referred to as the "dredge hole" is closed to fishing (except shore fishing on the Brule County side) during the months of January through April and December.

LFC anglers fishing in the late 1990s and early 2000s benefited from high walleye abundance resulting from conditions provided by unusually high water levels in 1995 and 1997. However, with water yield in the Missouri River Basin now entering the third consecutive year of well below normal conditions, past research (Stone 1997) and observations would suggest that it will be unrealistic to expect to maintain fish population abundance at the levels observed in the mid-to-late 1990s.

Maintaining LFC as one of South Dakota's productive fisheries resources requires that it be effectively managed to produce optimal recreational benefits, within the framework of protecting and maintaining the overall integrity of the aquatic community. The Missouri River Fisheries Program Strategic Plan (SDGFP 1994) documents the goal, objectives and strategies developed for management of this system. Annual acquisition and analysis of data describing the fish community and fish population parameters, in association with data describing angler use and sport fish harvest, is a primary strategy outlined in that

Table 1. Angler use and sport fish harvest statistics from creel surveys conducted on Lake Francis Case since 1954. TL = total length.

Year	Fishing pressure (h)	Angler days	Mean trip length (h)	Total fish harvest (No.)	Walleye harvest (No.)	Total harvest rate (Fish/ angler-h)	Walleye harvest rate (Fish/ angler-h)	Mean walleye TL(mm) in harvest	Reference
1954	84,000	35,000	2.4	115,000	0	1.369	0.000	-	Shields (1955)
1955	119,000	41,000	2.9	105,000	190	0.882	0.002	-	Shields (1956)
1956	159,000	47,500	3.4	89,500	177	0.563	0.001	-	Shields (1957)
1960	425,000	78,500	5.3	114,310	1,386	0.269	0.003	-	Nelson (1961)
1981*	565,890	99,280	5.7	173,730	145,412	0.307	0.257	-	Miller (1984)
1982	557,570	101,375	5.5	136,150	110,554	0.244	0.198	-	Miller (1984)
1983	425,060	74,570	5.7	102,070	70,434	0.240	0.166	-	Unkenholz et al. (1984)
1984	433,640	86,730	5.0	259,070	242,431	0.597	0.559	-	Stone (1985)
1989	604,100	115,290	5.2	289,854	222,008	0.480	0.368	340	Stone and Wickstrom (1991 a)
1990	383,711	81,641	4.7	117,155	64,596	0.305	0.169	368	Stone and Wickstrom (1991b)
1991	409,600	87,521	4.7	139,600	95,298	0.341	0.233	381	Stone and Wickstrom (1992)
1992#	640,215	127,215	5.0	267,105	217,841	0.417	0.339	386	Stone et al. (1994)
1993	589,153	115,520	5.1	126,231	95,425	0.214	0.161	386	Stone et al. (1994)
1994	695,371	131,202	5.3	220,386	174,775	0.317	0.251	386	Stone (1995)
1995	543,414	113,923	4.8	185,354	158,354	0.341	0.292	391	Stone (1996b)
1996	856,421	190,316	4.5	324,221	274,339	0.379	0.320	383	Stone (1997)
1997	652,510	143,409	4.6	307,297	285,463	0.471	0.437	385	Stone (1998)
1998	961,343	204,324	4.7	397,535	339,889	0.413	0.354	396	Stone and Sorensen (1999)
1999	997,871	212,902	4.7	359,440	285,186	0.360	0.286	417	Stone and Sorensen (2000)
2000	809,806	149,964	5.4	248,234	196,795	0.306	0.243	412	Stone and Sorensen (2001)
2001	780,962	152,830	5.1	242,869	199,372	0.311	0.255	409	Stone and Sorensen (2002)
2002	714,510	148,856	4.8	215,275	178,666	0.301	0.250	405	this study

Estimate projected from a creel survey for approximately 1/3 of reservoir.

 # Estimate was for May-August only.

plan. This work is required for evaluation of objectives and strategies outlined in that plan and as a prerequisite to effective development of future management strategies. This report describes data collected in 2002 from LFC and focuses the evaluation on changes in fish populations and associated angler use and sport fish harvest since 1998.

OBJECTIVES

The objectives of the two main surveys discussed in this report are to provide information on or estimates of:

Annual Fish Population Surveys (Federal Aid Project 2102):

(1) species composition
(2) relative abundance
(3) condition
(4) age, growth, and recruitment
(5) survival and mortality rates
(6) population size structure
(7) effects of regulations
(8) effects of stocking and other management activities
(9) effects of sport fish harvest

Fish tagging was also conducted to provide information on fish movement and angler exploitation.

Angler Use and Sport Fish Harvest Survey (Federal Aid Project 2109):

(1) recreational angling pressure
(2) angler harvest, by species
(3) angler harvest, release and catch rates, by species
(4) mean angler party size, mean length of angler day and angler residency
(5) annual economic impact of this sport fishery
(6) effects of regulations
(7) effects of stocking and other management activities
(8) angler demographics
(9) angler preference, satisfaction and attitudes

STUDY AREA

Lake Francis Case is located in south-central South Dakota (Figure 1). Historical, biological, chemical and physical parameters have been discussed in North Central Reservoir Investigation reports (Benson 1968; Gasaway 1970; Walburg 1977). Table 2 presents selected physical characteristics and management statistics for Lake Francis Case.

Water yield in the Missouri River system in 2002 was below normal and was the third consecutive year of below normal inflow after six years of above normal yield (Appendix 1; U.S. Army Corps of Engineers, unpublished data). During the spring of 2002, the elevation of LFC increased as was forecasted by the U.S. Army Corps of Engineers (USCOE) until late April, when as the result of a series of legal challenges, the USCOE began using water stored in LFC to support water releases downstream of Gavins Point Dam. Those releases resulted in the elevation of LFC declining by over 1.4 m (4 ft) by mid-May (Figure 2). The USCOE began refilling LFC in late May where it reached an elevation near 413 m msl (1354.5 ft.) by late

June, where it remained until the annual fall draw-down began in mid September. Appendix 1 presents monthly data on water released from Ft. Randall Dam.

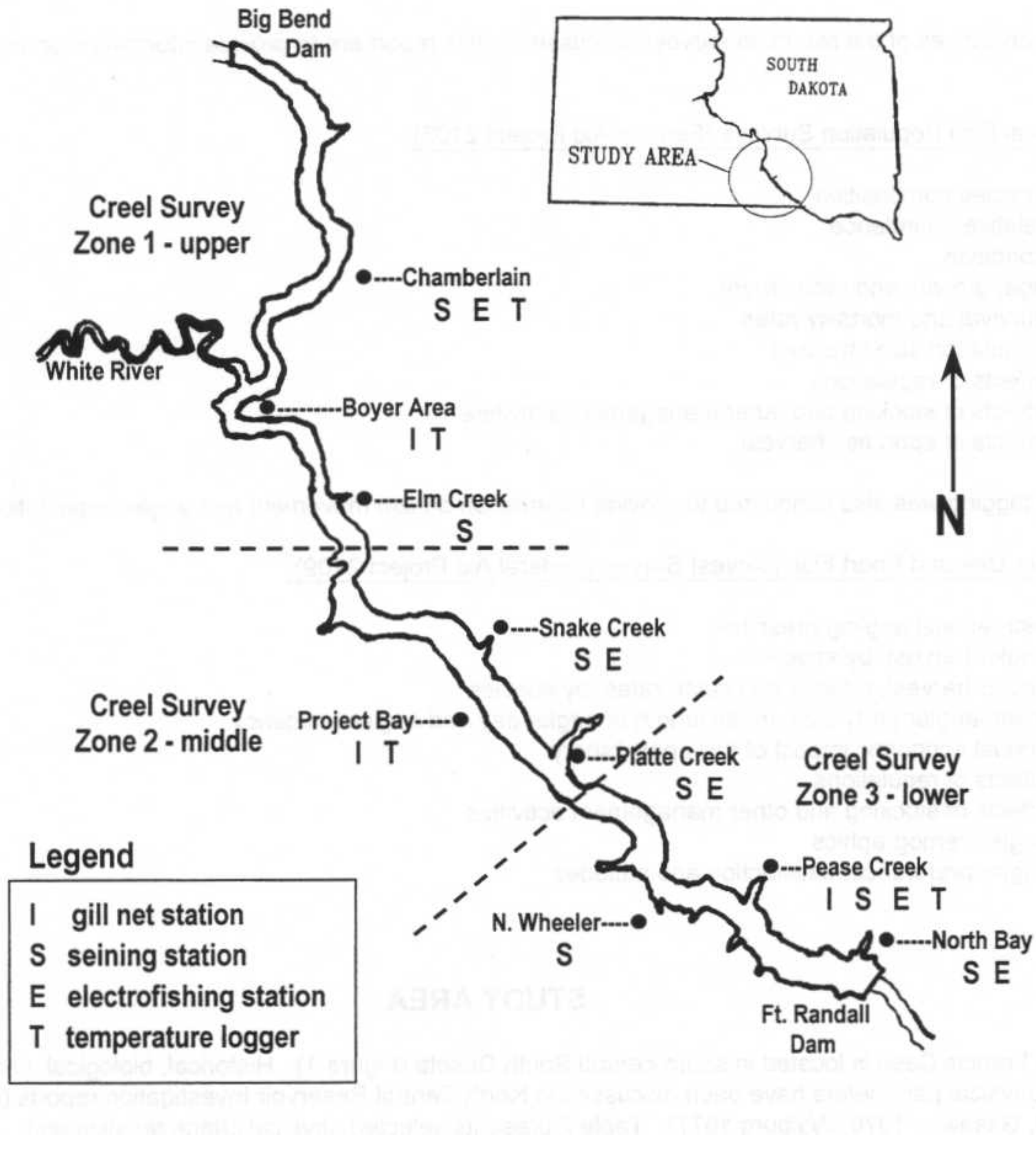

Figure 1. Lake Francis Case study area.

Table 2. Physical characteristics at base of flood control, management classification, and sampling times and depths for annual fish population surveys on Lake Francis Case.

	Lake Francis Case
Location:	From Pickstown to Ft. Thompson, SD
Surface Area (x 1000 ha):	32.0
Depth (m) - maximum: - mean:	42.6 15.2
Bottom:	Sand, gravel, shale and silt
Water source:	Missouri River and tributaries
Management classification:	Cool and warm water permanent
Electrofishing - walleye - smallmouth bass	April, May May, June
Gill net depths:	0-12 m (0-40 ft) 12-24 m (40-80 ft) 24-37 m (80-120 ft)
Number of gill nets:	27
Gill net date:	September
Seine date:	July

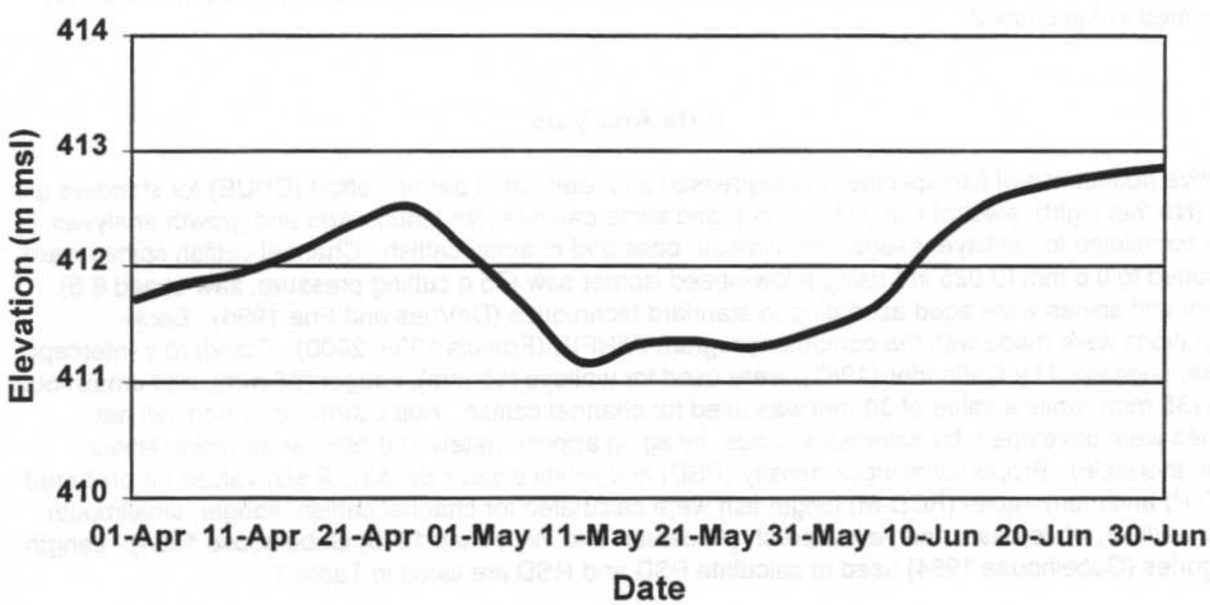

Figure 2. Spring 2002 Lake Francis Case reservoir elevation.

SAMPLING METHODS AND SCHEDULE

FISH POPULATION SURVEYS AND ASSOCIATED WORK ACTIVITIES

Data Collection

Gill nets, seines and electrofishing were used to sample fish populations in LFC at locations identified in Figure 1. Three variable-mesh standard gill nets (Lott et al. 1994) were fished overnight, on the bottom, in one embayment and in each depth zone (where possible), at each station (Table 2). All fish species collected were identified, counted measured for total length (TL; mm) and weighed (g). Scale samples (100 per species per sampling location) were collected from walleye, sauger, smallmouth bass and white bass, where possible. Pectoral spines were collected from channel catfish.

Pulsed-DC (60 pps, 8 amps) electrofishing, using a Smith Root GPP electrofishing boat, was used to collect walleye during April and smallmouth bass during May and June, for population monitoring (fish/min) and tagging studies. Walleye were collected near Chamberlain and off the face of Ft. Randall Dam. Smallmouth bass were collected at five locations: Chamberlain, Big Bend Dam tailwaters, Platte Creek, Pease Creek and near Ft. Randall Dam (Figure 1). All fish were measured for total length.

Nylon seines, previously described by Loft et al. (1994) were used to collect age-0 fishes and small littoral species. A quarter-arc seine haul was accomplished by methods described in Martin et al. (1981). Four seine hauls were made at each sampling station; two on each side of the reservoir. All fish collected with seines were identified to species and counted. Walleye were measured for total length.

Water temperature data was collected with submersible temperature loggers. Loggers, configured to record temperature every two hours, were deployed at four locations (Figure 1) on the reservoir between June 14 and June 28, 2002 and retrieved between September 6 and September 17,2002.

A list of common names, scientific names and abbreviations of fish mentioned throughout this report is presented in Appendix 2.

Data Analysis

Relative abundance of fish species was expressed as mean catch per unit effort (CPUE) for standard gill nets (No./net night), electrofishing (No./min.), and seine catches (No./haul). Age and growth analyses were completed for walleye, sauger, smallmouth bass and channel catfish. Channel catfish spines were sectioned to 0.6 mm (0.025 in.) using a low-speed isomet saw (75 g cutting pressure, saw speed 6.5). Scales and spines were aged according to standard techniques (DeVries and Frie 1996). Back-calculations were made with the computer program WINFIN (Francis 1999, 2000). Standard y-intercept values, suggested by Carlander (1982), were used for walleye (55 mm), sauger (55 mm), and smallmouth bass (35 mm), while a value of 30 mm was used for channel catfish. Age distributions from gill net catches were developed, for selected species, by aging approximately 100 fish per sampling station (when available). Proportional stock density (PSD) and relative stock density (RSD) values for preferred- (RSD-P) and memorable- (RSD-M) length fish were calculated for channel catfish, sauger, smallmouth bass, walleye, white bass, and yellow perch (Anderson and Weithman 1978; Gabelhouse 1984). Length categories (Gabelhouse 1984) used to calculate PSD and RSD are listed in Table 3.

Table 3. Minimum lengths (mm) of length class designations (Gabelhouse 1984).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	250	380	510	630	760
Sauger	200	300	380	510	630
Smallmouth Bass	180	280	350	430	510
Channel Catfish	280	410	610	710	910
White Bass	150	230	300	380	460
Yellow Perch	130	200	250	300	380

Relative weight(W,; Anderson 1980), for stock-to-quality-(S-Q), quality-to-preferred-(Q-P), and preferred-length-(P) fish (Table 3) was calculated using length designations established by Gablehouse (1984). Relative weight (W,) values were generated using standard weight (W_S) equations developed for walleye (Murphy et al. 1990), sauger (Guy et al. 1990), smallmouth bass (Kolander and Willis 1991), channel catfish (Brown et al. 1995), yellow perch (Willis et al. 1991), and white bass (Brown and Murphy 1991). Standard weight equations used in this report are provided in Appendix 3. Mean W, values were tested for differences among length-class designations using a one-way analysis of variance (SYSTAT, 1992). A mean *W,* value for stock-length fish is reported when no significant differences were detected among length categories. Statistical significance was set at $P < 0.05$.

Survival and mortality estimates for walleye, sauger, and smallmouth bass were calculated using catch curves (Ricker 1975). To reduce the effects of variable recruitment, two consecutive years of age-distribution data, from the gill net survey, were combined for analysis. Catch curves were analyzed to determine the age at which each species was fully recruited to the sampling gear. To estimate instantaneous mortality rates (Z), the slope of the regression of the natural logarithm of the number of fish of each age on fish age was used.

ANGLER USE AND SPORT FISH HARVEST SURVEY

A bus route creel survey design (Soupir and Brown 2002, Jones and Robson 1991), first utilized in 2000 (Stone and Sorensen 2001), was conducted to estimate angler use and harvest on LFC. Prior to 2000, fishing pressure was estimated by either aerial counts of fishing boats (Schmidt 1975) or by ground counts of boat trailers (Stone and Sorensen 1999). A bus route design is a modified access survey typically used for fisheries with numerous access sites spread over a broad geographical region (Robson and Jones 1989; Jones et. al. 1990). For a more detailed description of the bus route theory and techniques see Robson and Jones (1989), Jones and Robson (1991) and Pollock et al. (1994). Estimates of angler catch, harvest and release rates, along with information on mean party size, mean angler day length, angler residency, and angler age distribution were collected by interviewing anglers. Total fish catch, harvest and release estimates were calculated by multiplying the pressure estimate (angler hours) by the estimated catch, harvest or release rate (fish/angler hour). Despite the modification to the fishing pressure estimate technique, the survey design should provide statistics comparable to those previously determined for LFC (Miller 1984; Unkenholz et al. 1984; Stone 1985; Stone and Wickstrom 1991 a, 1991b, 1992; Stone et al. 1994; Stone 1995, 1996b, 1997, 1998; Stone and Sorensen 1999, 2000, 2001, 2002).

Sampling was conducted from 1 April 2002 through 30 September 2002, for the daylight period (sunrise to sunset). Creel zones are identified in Figure 1.

ANGLER PREFERENCE AND ATTITUDE SURVEY

A series of questions were selected by SDGFP reservoir fisheries biologists and human dimensions staff to measure angler satisfaction, preferences, and attitudes on several management issues. Questions selected, for this work, were those thought to have a direct relationship to current reservoir fisheries management.

Questions were asked of individual anglers by incorporating two different sets of questions into routine creel-survey-interview forms. One person, from each angling party, was asked one series of questions. The questions appeared on an alternating basis in an attempt to reduce duplication in subsequent interviews. Responses were encoded into a database for summary and analysis.

RESULTS

FISH POPULATION SURVEYS AND ASSOCIATED WORK ACTIVITIES

Species Composition and Relative Abundance

Results of spring electrofishing, conducted to monitor the timing and abundance of spawning walleye, are presented in Tables 4 - 6. Although not significantly different, overall walleye electrofishing CPUE in 2002, near Chamberlain increased after two consecutive years of decline and is near the mid-point of the five-year range (Table 4). Sampling near Ft. Randall Dam, during 2002, yielded the second highest CPUE of the five-year period (Table 5). The 2002 Ft. Randall spring walleye electrofishing CPUE was statistically similar ($P > 0.05$) to the previous four years, with only the 2001 value being significantly higher ($P < 0.05$) than the 1998 - 2000 values (Table 5).

Table 4. Electrofishing catch of walleye during spring-spawning-run sampling from Lake Francis Case, near Chamberlain, 1998-2002. Catch per unit effort (CPUE) values with the same letter code are not significantly different at the P = 0.05 level.

Year	Sampling time (min)	Number of fish	CPUE (fish/min)
1998	69	908	13.1 a
1999	50*	710	14.2 a
2000	65	707	10.9 a
2001	83	777	9.4 a
2002	50	623	12.5 a

* only two sampling runs were completed on 4-12-99 due to inclement weather

Table 5. Electrofishing catch of walleye during spring-spawning-run sampling from Lake Francis Case, near Ft. Randall Dam, 1998-2002. Catch per unit effort (CPUE) values with the same letter code are not significantly different at the P = 0.05 level.

Year	Sampling time (min)	Number of fish	CPUE (fish/min)
1998	90	176	2.0 a
1999	142	295	2.1 a
2000	80	183	2.3 a
2001	66	344	5.2 b
2002	120	445	3.7 ab

Table 6. Electrofishing data, by location and date, for walleye from Lake Francis Case, 2002. Catch per unit effort (CPUE) values, by location, with the same letter code are not significantly different at the P = 0.05 level.

Location	Date	Water temp. (C)	Sampling time (min)	No. of fish	CPUE (fish/min)
Chamberlain	4/15/02	8.2	15	161	10.7 a
Chamberlain	4/22/02	7.4	20	241	12.1 a
Chamberlain	4/29/02	7.6	15	221	14.7 a
Ft. Randall Dam	4/21/02	5.1	60	179	3.0 a
Ft. Randall Dam	4/28/02	7.3	60	266	4.4 a

Table 7 presents results of electrofishing sampling for smallmouth bass in LFC. Catch-per-unit-effort values, while not statistically different, increased at four of the five sampling stations. However, with the exception of Ft. Randall Dam, most smallmouth bass spring electrofishing CPUE's were near the low end of the of the sampling range over the past four-to-five years (Table 7).

Table 7. Electrofishing catch of smallmouth bass during spring sampling, at five locations on Lake Francis Case, 1998-2002. Catch per unit effort (CPUE) values with the same letter code are not significantly different at the P = 0.05 level.

Chamberlain			
Year	**Sampling time (min)**	**Number of fish**	**Fish/min**
1998	30	243	8.1 a
1999	30	162	5.4 ab
2000	30	108	3.6 ab
2001	45	45	1.0 b
2002	49	75	1.5 b
Big end Dam Tailwaters			
Year	**Sampling time (min)**	**Number of fish**	**Fish/min**
2001	60	49	0.8 a
2002	90	126	1.4 a
Platte Creek			
Year	**Sampling time (min)**	**Number of fish**	**Fish/min**
1998	**	**	**
1999	30	35	1.2 a
2000	90	67	0.7 a
2001	60	32	0.5 a
2002	90	12	0.1 a
Pease Creek			
Year	**Sampling time (min)**	**Number of fish**	**Fish/min**
1999	60	60	1.0 a
2000	45	27	0.6 a
2001	60	28	0.5 a
2002	90	50	0.6 a
Ft. Randall Dam			
Year	**Sampling time (min)**	**Number of fish**	**Fish/min**
1998	**	**	**
1999	30	104	3.5 a
2000	60	115	1.9 a
2001	60	76	1.3 a
2002	90	232	2.6 a

** Equipment and scheduling problems prohibited sampling at these locations

Fall gill-net sampling collected 16 species of fish from LFC in 2002 (Table 8). All species had been previously reported (Loft et al. 1994). Walleye, which had dominated the catch of sport fish since re-initiation of this survey in 1981 (Michaletz et al. 1986; Lott et al. 1994), accounted for 43% of the gill net catches, followed by sauger and channel catfish which accounted for 17% and 15% of the catches, respectively. Common carp, gizzard shad and smallmouth bass were also common in gill-net catches during 2002.

Walleye CPUE in gill nets, in 2002, increased from the previous year CPUE value and was near the mid-point of the five-year range (Table 8). This increase in abundance can be attributed primarily to a good year of walleye recruitment (age-0 CPUE in fall gill nets > 4.5 fish/net night) in 2002. CPUE of walleye in 2002 fall gill nets, excluding YOY, remained similar to the 2001 value (11.5 versus 10.7).

Sauger CPUE for 2002, at 6.3 fish/net night, was the highest of the 1998 - 2002 period, and was the highest sauger CPUE observed since re-initiation of this survey in 1981 (Michaletz et al. 1986; Lott et al. 1994). Channel catfish CPUE in gill nets increased for the second consecutive year and was the highest value of the five-year period. Smallmouth bass gill net CPUE also increased from the previous year and was at the high end of the five-year range. Yellow perch and white bass CPUE's were within the five-year sampling period range.

Sixteen species of age-0 fishes or small littoral species were collected by seining in 2002 (Table 9). All species had been previously reported for LFC (Lott et al. 1994). Age-0 gizzard shad dominated seine catches, as they have for the past five years, and accounted for 97% of the total seine catch. White bass, emerald shiners, yellow perch, walleye, and spottail shiners, comprising nearly 3% of the total catch, were also common in seines.

The age-0 walleye seining CPUE, of 3.5 fish/seine haul, while a large decrease from the previous year, was still one of the highest age-0 walleye CPUE observed in seines, since SDGFP began the seining survey in 1982 (Michaletz et al. 1986; Loft et al. 1994, Stone and Sorensen 1998). Unlike 2001 when over 50% of age-0 walleye collected in seine came from the lower half of the reservoir (Stone and Sorensen 2002), age-0 walleye collections in 2002 followed a more normal LFC pattern, with over 90% of the fish collected in the upper half of the reservoir. Walleye collected in seines averaged 80.0 mm (Table 10), over 10 mm longer than those collected the previous two years. Figure 3 presents a length frequency histogram of walleye from 2002 seines.

Table 8. Mean gill net catch per lift (CPUE; No./net night), sampling stations combined, on Lake Francis Case, 1998-2002. SE is standard error. Trace T < 0.1.

Species	1998 CPUE	1998 SE	1999 CPUE	1999 SE	2000 CPUE	2000 SE	2001 CPUE	2001 SE	2002 CPUE	2002 SE
Black bullhead	0.0		2.9	0.6	0.2	0.1	0.0		0.0	
Channel catfish	4.1	0.5	5.3	0.8	4.1	0.5	4.4	0.5	5.6	0.6
Common carp	2.7	0.6	2.5	0.5	1.1	0.3	0.9	0.3	1.8	0.4
Emerald shiner	0.2	0.1	0.0		T	-	T	-	0.0	
Freshwater drum	1.2	0.2	2.0	0.5	1.2	0.3	1.1	0.3	0.7	0.2
Gizzard shad	8.4	2.2	5.1	1.4	4.3	3.6	12.0	3.8	1.8	0.8
Goldeye	3.0	1.5	0.9	0.3	2.0	0.7	2.2	0.9	1.0	0.4
Northern pike	0.3	0.2	0.4	0.1	0.1	0.1	T	-	T	-
Rainbow trout	0.0		0.0		0.0		T	-	0.0	
River carpsucker	0.2	0.2	0.3	0.1	0.2	0.1	0.2	0.1	0.3	0.2
Sauger	5.3	1.2	5.1	0.9	5.5	0.6	4.9	0.7	6.3	1.0
Shorthead redhorse	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.1
Shortnose gar	0.3	0.2	T	-	0.1	0.1	0.1	0.1	0.0	
Shovelnose sturgeon	0.1	0.1	0.0		T	-	T	-	0.0	
Smallmouth bass	1.4	0.4	0.6	0.3	0.9	0.4	0.6	0.2	1.4	0.6
Smallmouth buffalo	T	-	T	-	T	-	0.0		T	-
Spottail shiner	0.0		0.0		T	-	T	-	T	-
Walleye	21.3	2.9	17.4	2.3	21.6	3.3	11.3	1.1	15.9	2.0
White bass	1.9	0.4	0.6	0.3	1.1	0.3	4.2	1.1	0.9	0.2
White crappie	3.3	0.9	0.9	0.3	0.1	0.1	0.7	0.3	0.1	0.1
Yellow perch	1.5	0.4	1.5	0.4	0.9	0.3	0.3	0.1	0.6	0.1

Table 9. Mean catch per seine haul (CPUE; No./haul), sampling stations combined, of age-0 fishes and small littoral species from Lake Francis Case, 1998-2002. SE is standard error. Trace T < 0.1

Species	1998		1999		2000		2001		2002	
	CPUE	SE	CPUE	SE	CPUE	SE	CPUE	**SE**	CPUE	SE
Bigmouth buffalo	0.0		0.0		0.0		T	-	0.0	
Black bullhead	0.0		25.9	25.4	0.0		0.0		0.0	
Black crappie	0.1	0.1	0.0		T	-	T	-	0.0	
Channel catfish	0.1	0.1	0.0		T	-	0.2	0.2	0.0	
Common carp	0.3	0.1	0.0		0.0		0.5	0.4	0.1	0.1
Common shiner	0.0		T	-	1.2	0.6	0.3	0.3	0.0	
Emerald shiner*	38.6	15.4	50.3	21.6	72.8	20.0	35.4	12.8	26.9	8.9
Fathead minnow*	0.3	0.1	10.9	5.1	0.1	0.1	1.7	1.0	T	-
Freshwater drum	23.4	8.6	0.4	0.2	2.0	1.6	0.5	0.3	1.0	0.6
Gizzard shad	70.5	34.9	544.7	391.6	202.0	101.6	793.7	495.1	3659.1	1610.8
Goldeye	0.0		0.0		0.3	0.1	0.3	0.3	T	-
Johnny darter*	1.9	1.0	1.0	0.5	2.3	0.9	3.2	1.4	0.4	0.3
Largemouth bass	0.1	0.1	0.0		0.0		0.0		0.0	
North. redbelly dace	0.0		0.0		0.0		T	-	0.0	
Red shiner*	0.0		1.6	1.0	0.2	0.2	0.6	0.3	0.4	0.2
River carpsucker	1.4	0.4	0.0		T	-	0.2	0.2	0.3	0.1
Sauger	0.0		0.0		0.0		0.3	0.2	T	-
Shorthead redhorse	0.0		0.0		0.0		T	-	0.0	
Silvery minnow	0.0		0.8	0.7	0.2	0.1	0.0		0.0	
Smallmouth bass	3.9	0.9	2.7	1.2	1.3	0.4	1.5	0.7	1.8	0.7
Smallmouth buffalo	0.5	0.2	0.0		0.2	0.2	1.8	0.8	T	-
Spottail shiner*	10.8	4.7	12.2	5.7	10.8	7.7	33.4	12.5	3.3	1.3
Walleye	T	-	0.1	0.1	1.1	0.5	11.9	4.7	3.5	1.3
White bass	17.9	7.8	10.1	5.5	59.1	33.0	389.1	130.0	65.1	23.4
White crappie	0.2	0.2	0.0		0.0		0.2	0.1	0.0	
Yellow perch	5.4	3.2	2.2	1.1	18.7	5.5	41.2	25.7	10.0	4.6

* Includes both age-0 and adults

Table 10. Number (No.), catch per unit effort (CPUE; No./haul), mean total length (TL) and length range for age-0 walleye collected by seines from Lake Francis Case, 1998 - 2002.

Year	No.	CPUE	Mean TL (mm)	Total length (mm) range
1998	1	T	93.0	93
1999	3	0.1	N/A	N/A
2000	30	1.1	67.5	58 - 83
2001	322	11.9	68.3	41 - 91
2002	95	3.5	80.0	63 - 109

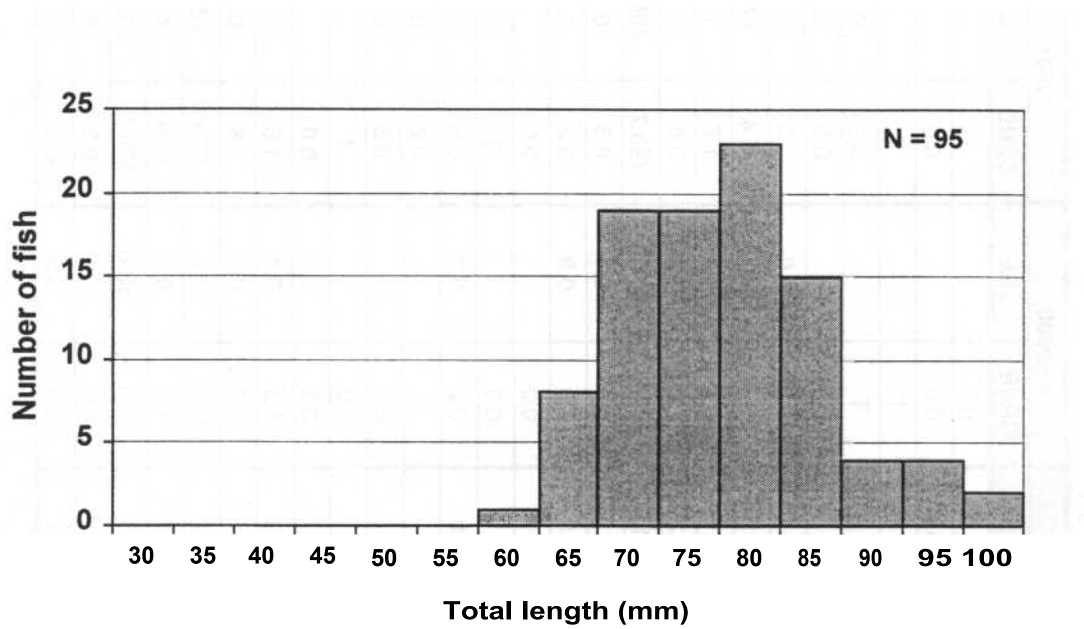

Figure 3. Length frequency of age-0 walleye collected with seines from Lake Francis Case, 2002. N = sample size.

Population Parameters for Walleye

Walleye growth, during 2001 (the last full year that growth could be calculated), was within the range of previous years for all age-classes, except age-4 fish (Table 11). Back-calculated length-at-age estimates are provided in Table 12. One concern with the use of minimum length limits is a reduction in growth rates resulting in "stockpiling" of fish just below the minimum length limit (Noble and Jones 1993). Current LFC length-at-age data suggests that stockpiling is not occurring. Mean walleye age in gill net samples, at 2.2 years, is near the high end of the five-year reporting period (Table 13). Walleye from seven year-classes were collected in the 2002 gill net survey (Table 13) and ranged in TL from 110-mm to 630-mm (Figure 4).

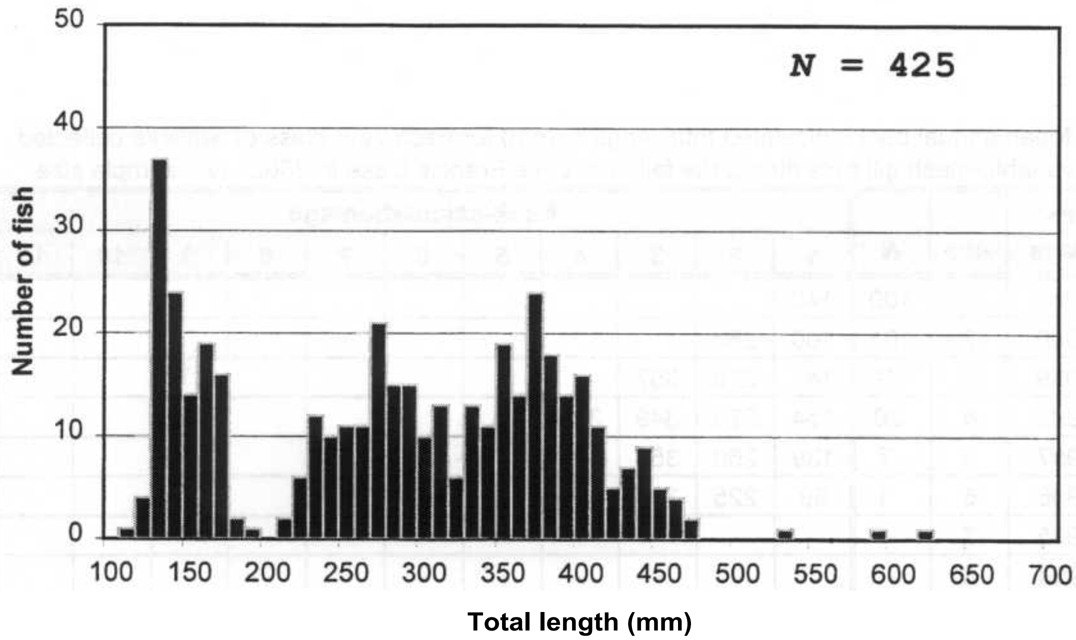

Figure 4. Length frequency of walleye collected with gill nets from Lake Francis Case, 2002.
N = sample size.

Annual survival, for pooled 2001 and 2002 data, was estimated at 39 percent (Table 13), the lowest of the five-year range. Relative weights for S-Q-length and Q-P-length, sampled in 2002, were in the ranges of previous years (Table 15), while the W_r for P-length walleye was the highest of the five-year range. The 2002 walleye PSD (Table 16), of 34, was similar to the 2001 value and remains near the upper end of the five-year range.

Table 11. Mean annual growth increments (mm) of back-calculated total lengths for each year class of walleye collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. *N*= sample size.

Year Class	Age	N	Growth increment at age										
			1	2	3	4	5	6	7	8	9	10	11
2001	1	100	140										
2000	2	101	160	123									
1999	3	71	147	129	81								
1998	4	26	154	119	76	49							
1997	5	7	139	121	97	51	32						
1996	6	1	99	126	84	56	56	21					
1995	7	-	-	-	-	-	-	-	-				
1994	8	-	-	-	-	-	-	-	-	-			
1993	9	-	-	-	-	-	-	-	-	-	-		
1992	10	-	-	-	-	-	-	-	-	-	-	-	
1991	11	1	202	108	96	57	24	18	33	11	28	32	13
All classes			149	122	84	53	41	24	65	11	29	32	14
N		307	307	207	106	35	9	2	1	1	1	1	1

Table 12. Mean annual back-calculated total lengths (mm) for each year class of walleye collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. N = sample size.

Year Class	Age	N	Back-calculation age 1	2	3	4	5	6	7	8	9	10	11
2001	1	100	140										
2000	2	101	160	283									
1999	3	71	147	276	357								
1998	4	26	154	273	349	398							
1997	5	7	139	260	357	408	440						
1996	6	1	99	225	309	365	421	442					
1995	7	-	-	-	-	-	-	-	-				
1994	8	-	-	-	-	-	-	-	-	-			
1993	9	-	-	-	-	-	-	-	-	-	-		
1992	10	-	-	-	-	-	-	-	-	-	-	-	
1991	11	1	202	310	406	463	487	505	538	549	577	609	622
All classes			149	271	355	408	449	473	538	549	577	609	622
N		307	307	207	106	35	9	2	1	1	1	1	1

Table 13. Age distribution of walleye collected from Lake Francis Case with variable-mesh gill nets, 1998-2002. Mean age excludes age-0 fish.

Year	Age 0	1	2	3	4	5	6	7	8	9	10	11	Mean
1998	117	193	103	116	45	12	1	1	0	0	0	0	1.7
1999	85	193	97	50	28	10	6	2	1	0	0	0	1.6
2000	59	107	206	134	28	36	8	2	1	0	0	0	2.2
2001	16	77	112	54	34	3	4	1	0	0	0	0	2.3
2002	117	100	101	71	26	7	1	0	0	0	0	1	2.2

Table 14. Estimates of annual survival (S), annual mortality (A), and instantaneous mortality rates (Z) for age-1-and-older fish of selected species, from Lake Francis Case. Years indicate which years of annual pill net survey data were combined for analysis.

Species	Years	S	A	-z	R^2
Walleye	1997-1998	0.43	0.57	0.846	0.866
	1998-1999	0.42	0.58	0.870	0.971
	1999-2000	0.46	0.54	0.767	0.953
	2000-2001	0.43	0.57	0.846	0.911
	2001-2002	0.39	0.61	0.940	0.916
Sauger	1997-1998	0.52	0.48	0.652	0.841
	1998-1999	0.35	0.65	1.049	0.896
	1999-2000	0.34	0.66	1.078	0.887
	2000-2001	0.36	0.64	1.018	0.918
	2001-2002	0.31	0.69	1.166	0.839
Smallmouth bass	1997-1998	0.49	0.51	0.719	0.872
	1998-1999	0.44	0.56	0.813	0.928
	1999-2000	0.65	0.35	0.424	0.542
	2000-2001	0.49	0.51	0.723	0.565
	2001-2002	0.54	0.46	0.607	0.820

Table 15. Mean relative weight, by length category, for Lake Francis Case walleye, sauger, and smallmouth bass, 1998-2002. S-Q = stock-to- quality length, Q-P = quality-to-preferred length, P = preferred length. N = sample size.

Walleye				
Year	**S-Q**	**Q-P**	**P**	N
1998	81	83	81	399
1999	82	81	72	278
2000	83	82	78	482
2001	82	83	78	243
2002	83	81	86	274
Sauger				
Year	**S-Q**	**Q-P**	**P**	N
1998	83	79	82	105
1999	78	78	79	117
2000	74	72	69	146
2001	74	76	75	128
2002	76	73	73	119
Smallmouth bass				
Year	*S-Q*	***Q-P***	*P*	*N*
1998	101	104	-	30
1999	103	106	-	13
2000	118	111	109	23
2001	111	110	119	12
2002	111	107	101	29

Table 16. Walleye, sauger, and smallmouth bass proportional stock density (PSD) and relative stock density for preferred- and memorable-length fish (RSD-P and RSD-M, respectively), for Lake Francis Case gill net data, 1998-2002.

Species	1998	1999	2000	2001	2002
Walleye	30(1,0)	27(5,0)	37(3,0)	34(0,0)	34(1,0)
Sauger	68 (20,1)	56 (27,1)	56 (21,0)	69 (17,0)	63 (20,0)
Smallmouth bass	33(0,0)	15(0,0)	61 (9,0)	50(8,0)	35(7,0)

Data on walleye tagged in LFC during 1999 through 2002 are presented in Table 17. In 2002, only walleye 450 mm or greater in total length were tagged. During 2002, anglers returned (harvested fish) 8.5% of the tags placed that spring and an additional 4.7% of the 2001 tags, 1.2% of the 2000 tags and 1.0% of the 1999 tags (Table 17). Despite only larger fish being tagged, tag recovery percentages from harvested fish, through the first year after tagging, were near the range of pervious years tagging (Table 17) by both location and total number returned. Generally, as with past LFC tagging studies (Unkenholz et al. 1984; Riis et al. 1993), walleye were recaptured in the general vicinity of their tagging location. However, five walleye tagged at Chamberlain did make long downstream movements of over 65 river-miles prior to their capture. One walleye tagged in 2001 at Chamberlain was recaptured in 2002 below Ft. Randall Dam. In addition to the walleye being reported as harvested, an additional 2.0 percent of the 2002 tagged fish were reported as being caught and released at least one time.

Table 17. Number of walleye tagged, by location, and angler tag returns (number and percent of total number taaaed). from harvested fish. Lake Francis Case. 1999-2002.

Tagging locations	Number tagged	Tags returned									
		Year returned								Cumulative	
		1999		2000		2001		2002			
1999 tags		No.	%	No.	%	No.	%	No.	%	Total	%
Chamberlain	1047	94	9.0	57	5.4	41	3.9	11	1.1	203	19.4
Ft. Randall Dam	300	35	11.7	13	4.3	13	4.3	3	1.0	64	21.3
Total	1347	129	9.6	70	5.2	54	4.0	14	1.0	267	19.8
2000 tags											
Chamberlain	999			96	9.6	84	8.4	12	1.2	192	19.2
Ft. Randall Dam	200			25	12.5	16	8.0	2	1.0	43	21.5
Total	1199			121	10.1	100	8.3	14	1.2	235	19.6
2001 tags											
Chamberlain	999					117	11.7	45	4.5	162	16.2
Ft. Randall Dam	300					42	14.0	16	5.3	58	19.3
Total	1299					159	12.2	61	4.7	220	16.9
2002 tags											
Chamberlain	140							13	9.3	13	9.3
Ft. Randall Dam	61							4	6.6	4	6.6
Total	201							17	8.5	17	8.5

Table 18 provides 2002 tagging and recapture statistics for LFC walleye, by length group. While the percent of fish caught 450 mm or greater in total length was higher than for the overall population tagged (Table 17) in 2002, the high proportion of those fish harvested (kept) by anglers is cause for concern.

Table 18. Walleye tagging and recapture statistics, by length group, for fish tagged during 2002 in Lake Francis Case. Only walleye 450 mm or longer were tagged.

Length group (mm)	Number tagged	Number			Percent caught	Percent of those caught	
		Caught	Kept	Released		Kept	Released
450-499	147	21	17	4	14	81	19
500-549	48	3	2	1	6	67	33
550-599	4	1	1	0	25	100	0
600-649	2	0	0	0	0	0	0
Total	201	25	20	5	12	80	20

Figure 5 presents yearly total walleye abundance (CPUE), as indexed by fall gill netting, partitioned by selected age and size groups and plotted against total runoff (millions of acre-feet) into the Missouri River system. Two factors have been credited for the improvements in walleye abundance and age structure, that was observed through the mid-1990's. First, walleye population parameter improvements were noted soon after sport-fishing-regulation changes were implemented in 1990 (Stone 1991). The population further responded to the good habitat/nutrient conditions provided by the high runoff into the Missouri River system during 1993-1997 (Stone 1997b). The general decline in overall walleye abundance observed beginning in 1996 through this current survey can be attributed to high angler harvest coupled with declining habitat conditions, as Missouri River water yield returned to more normal levels in 1998 and 1999 followed by three consecutive years of drought conditions. While the 2002 walleye population abundance has increased over that observed in the fall of 2001, most of that increase can be attributed to the 2002 abundance of age-0 fish. Overall the 2002 walleye population structure, excluding Age-0 fish, is very similar to that observed in the fall of 2001.

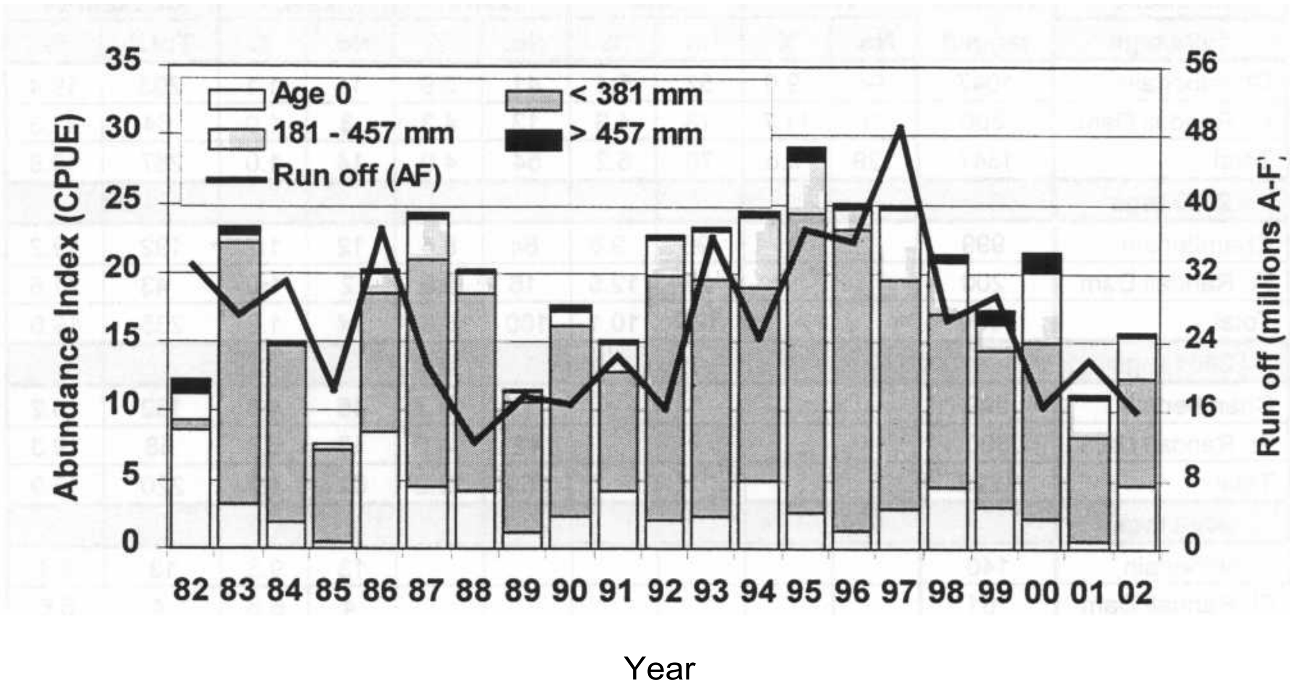

Figure 5. Lake Francis Case total walleye abundance and abundance of walleye age 0, less than 381 mm (15 in.), 381- 457 mm (15 - 18 in.), and greater than 457 mm (18 in.), plotted against total runoff (millions of acre-feet) into the Missouri River system. 1982-2002.

Population Parameters for Sauger

Sauger abundance in LFC, at a mean CPUE of 6.3 fish/net night, increased in 2002 and is the highest of the five-year reporting period (Table 8). Lengths of sauger sampled in the 2002 gill net survey ranged from 120 mm to 450 mm TL (Figure 6). Sauger growth increments and back-calculated length-at-age during 2001 (the last full year that growth could be calculated) are presented in Tables 19 and 20. Mean sauger W, values, for the various length categories are within the five-year range (Table 15).

Six year classes of sauger were sampled by gill nets in 2002 (Table 21). The mean age of 1.9 years is within the range of the five-year period (Table 21). Strong 1999 and 2000 year classes continue to dominate the current adult sauger population, with indications that 2002 was also a good reproductive year. Annual sauger survival for the 2001 and 2002 pooled data decreased to 31 % (Table 14). Sauger PSD of 63, is within the range of the five-year period (Table 16).

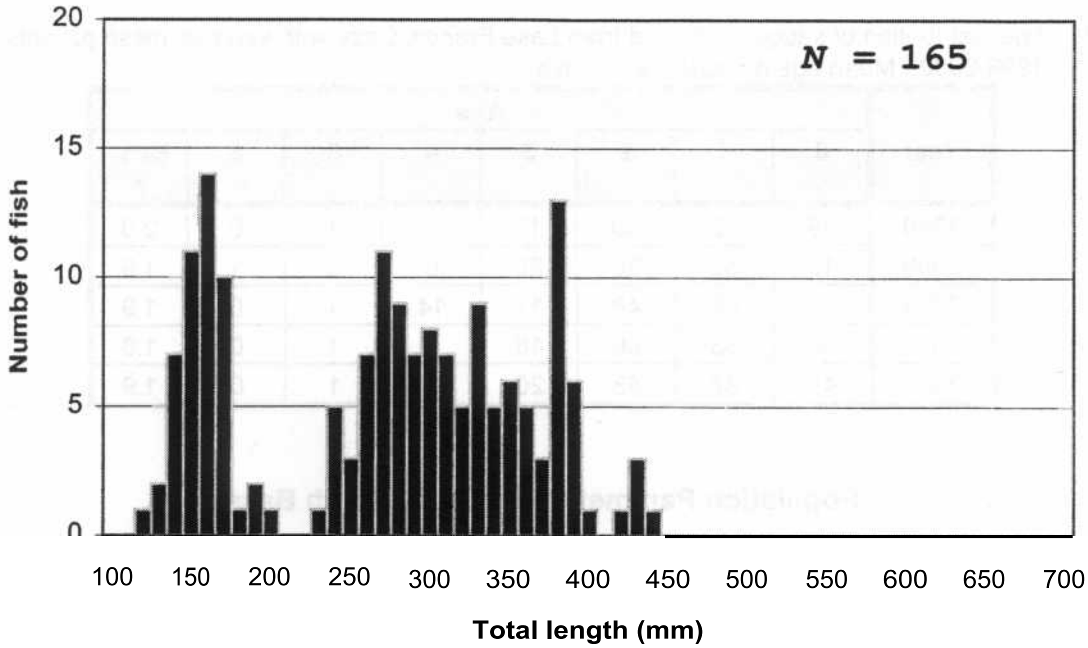

Figure 6. Length frequency of sauger collected with gill nets from Lake Francis Case, 2002. *N* = sample size.

Table 19. Mean annual growth increments (mm) of back-calculated total lengths for each year class of sauger collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. *N* = sample size.

Year class	Age	*N*	Growth increment at age				
			1	2	3	4	5
2001	1	37	157				
2000	2	58	195	97			
1999	3	20	207	97	52		
1998	4	2	208	106	55	30	
1997	5	1	252	90	32	39	11
All classes			204	109	54	40	18
N		118	118	81	23	3	1

Table 20. Mean back-calculated total lengths (mm) for each year class of sauger collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. N = sample size.

Year class	Age	*N*	Length at age				
			1	2	3	4	5
2001	1	37	157				
2000	2	58	195	292			
1999	3	20	207	304	356		
1998	4	2	208	314	369	399	
1997	5	1	252	342	374	413	424
All classes			204	313	366	406	424
N		118	118	81	23	3	1

Table 21. Age distribution of sauger collected from Lake Francis Case with variable-mesh gill nets, 1998-2002. Mean age excludes age-0 fish.

Year	Age							
	0	1	2	3	4	5	6	Mean
1998	39	32	50	17	5	1	0	2.0
1999	19	53	28	29	6	0	1	1.9
2000	3	66	48	17	14	1	0	1.9
2001	4	53	56	18	0	1	0	1.8
2002	49	37	58	20	2	1	0	1.9

Population Parameters for Smallmouth Bass

Smallmouth bass CPUE in 2002 in both gill nets (Table 8) and electrofishing (Table 7), with the exception of the Platte Creek station, increased over the 2001 values. The increase in smallmouth bass CPUE's, while not statistically significant, suggests that smallmouth bass abundance maybe on the increase after several years of below average recruitment (Stone and Sorensen 2000, 2001, 2002). Annual growth increments and back-calculated lengths of smallmouth bass from LFC during 2001 (the last full year that growth could be calculated) are presented in Tables 22 and 23. Small sample size prevents meaningful growth comparisons with previous year's data from being made. Smallmouth bass condition remains excellent, as W_W values for all length categories sampled were above 100 (Table 15).

Table 22. Mean annual increments (mm) of back-calculated total lengths for each year class of smallmouth bass collected with variable-mesh gill nets during the fall from Lake Francis Case in 2001. *N* = sample size.

Year class	Age	*N*	Growth increment at age			
			1	2	3	4
2001	1	22	102			
2000	2	11	96	119		
1999	3	3	114	111	102	
1998	4	1	73	130	106	74
All classes			97	118	104	65
N		37	37	14	3	1

Table 23. Mean back-calculated total lengths (mm) for each year class of smallmouth bass collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. *N* = sample size.

Year class	Age	*N*	Length at age			
			1	2	3	4
2001	1	22	102			
2000	2	11	96	215		
1999	3	3	114	225	327	
1998	4	1	73	203	309	383
All classes			97	214	318	383
N		37	37	15	4	1

Four year classes were represented in the 2002 gill net sample, with a mean age of 1.6 years (Table 24). Smallmouth bass PSD for the gill net sample decreased to 35 (Table 16), reflective of the gill net sample being dominated by age-1 fish. Annual survival, for pooled 2001 and 2002 gill net data, was 54 percent (Table 14). Lengths of fish sampled by spring electrofishing ranged from 70 mm to 420 mm TL, while those collected by fall gill nets ranged from 140 mm to 430 mm TL (Figure 7).

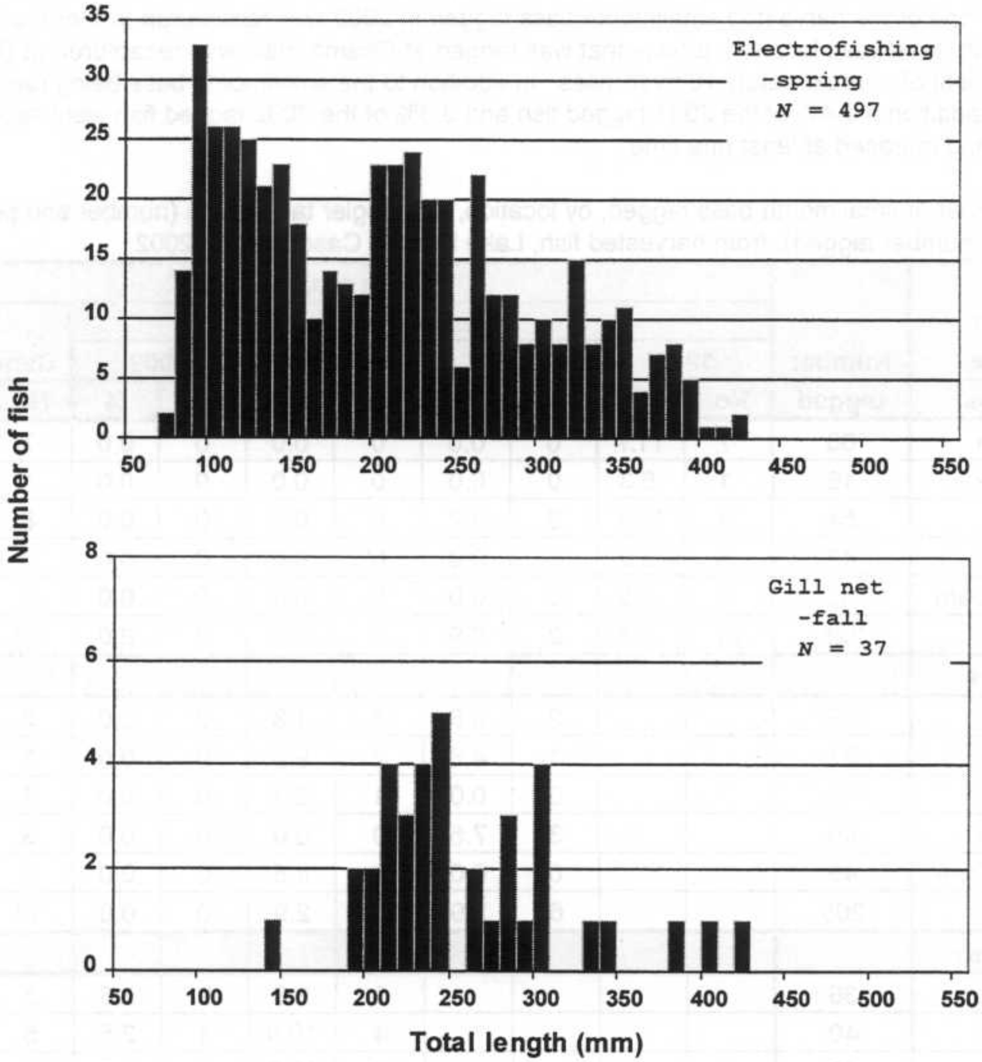

Figure 7. Length frequencies of smallmouth bass collected by spring electrofishing and fall gill netting from Lake Francis Case, 2002. N = sample size

Table 24. Age distribution of smallmouth bass collected from Lake Francis Case with variable-mesh gill nets, 1998-2002. Mean age excludes age-0 fish.

	Age							
Year	0	1	2	3	4	5	6	Mean
1998	7	9	16	5	2	1	0	2.1
1999	1	9	5	0	0	0	0	1.4
2000	0	5	13	6	0	0	0	2.0
2001	0	4	4	3	1	0	0	2.1
2002	0	22	11	3	0	0	1	1.6

Data on smallmouth bass tagged at five locations in LFC during 2000, 2001 and 2002 are presented in Table 25. During 2002, anglers returned (harvested fish) only 4.7% of the tags placed that spring, and an additional 1.3% of the 2001 tags (Table 25). No tags, that were placed in 1999 and 2000, were returned by LFC anglers in 2002 (Table 25). Tag return percentages, by location tagged, for 2002 tagged fish that were harvested ranged from a low of 2.9% at Ft. Randall Dam to a high of 17.6% for smallmouth bass tagged at Pease Creek (Table 25). As observed with fish tagged the previous three years (Stone and Sorensen 2000, 2001, 2002) smallmouth bass were recaptured at, or very near to, their original tagging location. Only one of the harvested smallmouth bass tagged in 2002 was recaptured farther than 4 river-miles away from its release location, a bass that was tagged at Chamberlain was recaptured at Big Bend Dam, a movement of approximately 18 river miles. In addition to the smallmouth bass being reported as harvested, an additional 0.4% of the 2001 tagged fish and 3.3% of the 2002 tagged fish were reported as being caught and released at least one time.

Table 25. Number of smallmouth bass tagged, by location, and angler tag returns (number and percent of total number tagg ed), from harvested fish, Lake Francis Case, 1999 - 2002.

Tagging Locations	Number tagged	Tags returned									
		Year returned								Cumulative	
		1999		2000		2001		2002			
1999 tags		No.	%	N	%		%	No.	%	No.	
Chamberlain	60	7	11.7	0	0.0	0	0.0	0	0.0	7	11.7
Snake Creek	16	1	6.3	0	0.0	0	0.0	0	0.0	1	6.3
Platte Creek	54	6	11.1	2	3.7	0	0.0	0	0.0	8	14.8
Pease Creek	43	3	7.0	0	0.0	0	0.0	0	0.0	3	7.0
Ft. Randall Dam	53	4	7.5	0	0.0	0	0.0	0	0.0	4	7.5
Total	226	21	9.3		0.9	0	0.0	0	0.0	23	10.2
2000 tags											
Chamberlain	56			2	3.6	1	1.8	0	0.0	3	5.4
Snake Creek	21			1	4.8	2	9.5	0	0.0	3	14.3
Platte Creek	43			0	0.0	1	2.3	0	0.0	1	2.3
Pease Creek	40			3	7.5	0	0.0	0	0.0	3	7.5
Ft. Randall Dam	45			0	0.0	2	4.5	0	0.0	2	4.5
Total	205			6	2.9	6	2.9	0	0.0	12	5 8
2001 tags											
Big Bend Dam	36					3	8.3	2	5.6	5	13.9
Chamberlain	40					4	10.0	1	2.5	5	12.5
Platte Creek	40					6	15.0	1	2.5	7	17.5
Pease Creek	50					4	8.0	0	0.0	4	8.0
Ft. Randall Dam	64					5	7.8	0	0.0	5	7.8
Total	230					22	9 6	4	1.7	26	11.3
2002 tags											
Big Bend Dam	32							1	3.1	2	6.3
Chamberlain	58							2	3.4	4	6.9
Platte Creek	9							0	0.0	1	11.1
Pease Creek	17							3	17.6	4	23.5
Ft. Randall Dam	34							1	2.9	1	2.9
Total	150							7	4.7	12	8.0

Table 26 provides 2002 LFC smallmouth bass tagging and recapture statistics, by length group. The low sample size makes it difficult to draw conclusions from this data.

Table 26. Smallmouth bass tagging and recapture statistics, by length group, for fish tagged during 2002 in Lake Francis Case.

Length Group (mm)	Number Tagged	Number Caught		Released	Percent Caught	Percent of those caught Kept	Released
250-299	60	2	2	0	3.0	100	0
300-349	51	8	5	3	16.0	63	38
350-399	35	1	0	1	3.0	0	100
400-449	4	1	0	1	25.0	0	100
Total	150	12	7	5	8.0	58	42

Population Parameters for Channel Catfish

Channel catfish gill net CPUE in 2002 (Table 8) increased over previous years and was the highest of the five-year period. Channel catfish ranging from 120 mm to 660 mm TL (Figure 8) were collected by gill nets. Channel catfish PSD, RSD and W_r values are presented in Appendix 5. Table 27 presents back-calculated length at age for channel catfish collected in 2002 fall gill nets.

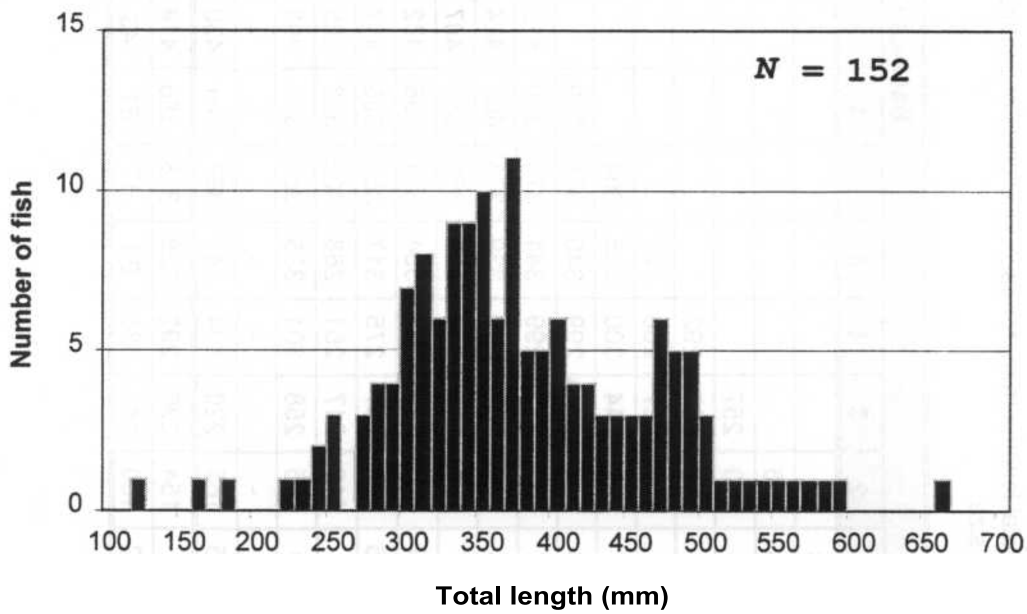

Figure 8. Length frequency of channel catfish collected with gill nets from Lake Francis Case, 2002. N = sample size.

Table 27. Mean annual back-calculated total lengths (mm) for each year class of channel catfish collected with variable-mesh gill nets during the fall from Lake Francis Case in 2002. N = sample size.

Year Class	Age	N	Back-calculation age															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
2001	1	2	68															
2000	2	9	75	175														
1999	3	6	84	170	257													
1998	4	36	81	157	237	292												
1997	5	32	81	139	227	288	327											
1996	6	16	84	157	244	300	335	364										
1995	7	8	86	142	234	299	340	365	389									
1994	8	12	94	152	237	299	341	375	399	419								
1993	9	8	98	160	237	310	339	376	401	424	440							
1992	10	5	87	151	219	280	323	351	383	407	427	446						
1991	11	10	107	160	240	301	334	371	396	432	457	480	497					
1990	12	4	105	155	237	275	317	359	385	417	446	469	486	505				
1989	13	1	91	115	217	251	268	302	336	386	420	454	471	505	539			
1988	14	2	90	165	258	301	335	353	383	398	428	451	471	482	504	519		
1987	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
1986	16	1	135	165	220	304	346	367	401	430	451	472	493	536	578	611	628	654
All classes			91	154	236	292	328	358	386	414	439	462	484	507	540	565	628	654
N		152	152	150	141	135	99	67	51	43	31	23	18	8	4	3	1	1

VIEW NEXT SECTION